3.9 GREENHOUSE GAS EMISSIONS/CLIMATE CHANGE

3.9.1 Introduction

This section focuses on the potential for the Species Conservation Habitat (SCH) Project to affect global climate change through the release of greenhouse gases (GHG) into the atmosphere, both directly (from equipment and vehicle emissions during construction and operations) and indirectly (from use of electricity from off-site power plants).

Global warming is the name given to the increase in the average temperature of the Earth's near-surface air and oceans since the mid-20th century and its projected continuation. Warming of the climate system is now considered to by unequivocal (Intergovernmental Panel on Climate Change [IPCC] 2007) with global surface temperature increasing approximately 1.33 degrees Fahrenheit (°F) over the last one hundred years. Continued warming is projected to increase global average temperature between 2 and 11 °F over the next one hundred years.

The causes of this warming have been identified as both natural processes and as the result of human actions. The IPCC concludes that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. However, after 1950, increasing GHG concentrations resulting from human activity such as fossil fuel burning and deforestation have been responsible for most of the observed temperature increase. These basic conclusions have been endorsed by more than 45 scientific societies and academies of science, including all of the national academies of science of the major industrialized countries. Since 2007, no scientific body of national or international standing has maintained a dissenting opinion.

Increases in GHG concentrations in the Earth's atmosphere are thought to be the main cause of human induced climate change. GHGs naturally trap heat by impeding the exit of solar radiation that has hit the Earth and is reflected back into space. Some GHGs occur naturally and are necessary for keeping the Earth's surface inhabitable. However, increases in the concentrations of these gases in the atmosphere during the last hundred years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

The principal GHGs are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), perfluorocarbons (PFC), hydrofluorocarbons (HFC), and water vapor. Each of the principal GHGs has a long atmospheric lifetime (one year to several thousand years). In addition, the potential heat trapping ability of each of these gases vary significantly from one another. Methane is 23 times as potent as carbon dioxide, while sulfur hexafluoride is 22,200 times more potent than carbon dioxide. Conventionally, GHGs have been reported as carbon dioxide equivalents (CO_2e). CO_2e takes into account the relative potency of non-CO_2 GHGs and converts their quantities to an equivalent amount of CO_2 so that all emissions can be reported as a single quantity.

The primary man-made processes that release these gases include burning of fossil fuels for transportation, heating and electricity generation; agricultural practices that release methane such as livestock grazing and crop residue decomposition; and industrial processes that release smaller amounts of high global warming potential (GWP) gases such as SF_6, PFCs, and HFCs. Deforestation and land cover conversion have also been identified as contributing to global warming by reducing the Earth's capacity to remove CO_2 from the air and altering the Earth's albedo or surface reflectance, allowing more solar radiation to be absorbed.

The study area for GHG emissions and climate change includes the Project site(s), the routes used to transport people, equipment, and materials to the Project site(s), and the areas both within California and out of state where electrical power to serve the Project would be generated. Because GHGs affect climate change on a global level, the area of potential impact is the entire planet.

Table 3.9-1 summarizes the impacts of the six Project alternatives on GHG emissions and climate change, compared to both the existing conditions and the No Action Alternative.

Table 3.9-1 Summary of Impacts on GHG Emissions/Climate Change

Impact	Basis of Comparison	Project Alternative						Mitigation Measures
		1	2	3	4	5	6	
Impact GHG-1: The Project would generate minor amounts of GHG emissions during construction and operations, both directly and indirectly, that would not have a significant impact on the environment.	Existing Condition	L	L	L	L	L	L	None required
	No Action	L	L	L	L	L	L	None required
Impact GHG 2: The Project would generate GHG emissions during construction and operations, but would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions.	Existing Condition	L	L	L	L	L	L	None required
	No Action	L	L	L	L	L	L	None required

Note:
O = No Impact
L = Less-than-Significant Impact
S = Significant Impact, but Mitigable to Less than Significant
U = Significant Unavoidable Impact
B = Beneficial Impact

3.9.2 Regulatory Requirements

3.9.2.1 Federal Law, Policies, and Plans

Council on Environmental Quality Guidance

In February 2010, the Council on Environmental Quality (CEQ) issued its *Draft National Environmental Policy Act (NEPA) Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*, which proposed that projects analyzed under NEPA should consider potential impacts associated with GHG emissions and climate change. The Guidance Memorandum addresses two related issues: (1) the treatment of GHG emissions that may directly or indirectly result from the proposed Federal action and (2) the analysis of potential climate change impacts upon the proposed Federal action. If a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. For long-term actions that have annual direct emissions of less than 25,000 metric tons of CO_2-equivalent emissions, CEQ encourages Federal agencies to consider whether the action's long-term emissions should receive similar analysis. CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs. CEQ proposes that

this analysis should also consider applicable Federal, state, or local goals for energy conservation and alternatives for reducing energy demand or GHG emissions associated with energy production.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, the United States Environmental Protection Agency (USEPA) released its final Greenhouse Gas Reporting Rule (Reporting Rule). The Reporting Rule is a response to the fiscal year 2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110-161), that required USEPA to develop "… mandatory reporting of greenhouse gases above appropriate thresholds in all sectors of the economy…." The Reporting Rule would apply to most entities that emit 25,000 metric tons of carbon dioxide equivalents (CO_2e) or more per year. Starting in 2010, facility owners are required to submit an annual GHG emissions report with detailed calculations of facility GHG emissions. The Reporting Rule would also mandate recordkeeping and administrative requirements in order for USEPA to verify annual GHG emissions reports.

United States Environmental Protection Agency Endangerment and Cause and Contribute Findings

On December 7, 2009, the Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** the current and projected concentrations of the six key well-mixed GHGs—carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

3.9.2.2 State Laws, Policies, and Plans

Table 3.9-2 summarizes state laws and executive orders that address climate change. The most significant laws and orders are discussed in greater detail below.

Table 3.9-2 Summary of State Laws and Executive Orders that Address Climate Change

Legislation Name	Signed into Law/ Ordered	Description	California Environmental Quality Act Relevance
SB 1771	09/2000	Establishment of California Climate Registry to develop protocols for voluntary accounting and tracking of GHG emissions.	In 2007, California Department of Water Resources (DWR) began tracking GHG emissions for all departmental operations.
AB 1473	07/2002	Directs ARB to establish fuel standards for noncommercial vehicles that would provide the maximum feasible reduction of GHGs.	Reduction of GHG emissions from noncommercial vehicle travel.

Table 3.9-2 Summary of State Laws and Executive Orders that Address Climate Change

Legislation Name	Signed into Law/ Ordered	Description	California Environmental Quality Act Relevance
SB 1078, 107, EO S-14-08	09/2002, 09/2006, 11/2008	Establishment of renewable energy goals as a percentage of total energy supplied in the State.	Reduction of GHG emissions from purchased electrical power.
EO S-3-05, AB 32*	06/2005, 09/2006	Establishment of statewide GHG reduction targets and biennial science assessment reporting on climate change impacts and adaptation and progress toward meeting GHG reduction goals.	Projects required to be consistent with statewide GHG reduction plan and reports will provide information for climate change adaptation analysis.
SB 1368	9/2006	Establishment of GHG emission performance standards for base load electrical power generation.	Reduction of GHG emissions from purchased electrical power.
EO S-1-07	01/2007	Establishment of Low Carbon Fuel Standard.	Reduction of GHG emissions from transportation activities.
SB 97*	08/2007	Directs OPR to develop guideline amendments for the analysis of climate change in CEQA documents.	Requires climate change analysis in all CEQA documents.
SB 375	09/2008	Requires metropolitan planning organizations to include sustainable communities' strategies in their regional transportation plans.	Reduction of GHG emissions associated with housing and transportation.
EO S-13-08*	11/2008	Directs the Resource Agency to work with the National Academy of Sciences to produce a California Sea Level Rise Assessment Report. And directs CAT to develop a California Climate Adaptation Strategy.	Information in the reports will provide information for climate change adaptation analysis.

California Environmental Quality Act and SB 97

The California Environmental Quality Act (CEQA) requires lead agencies to consider the reasonably foreseeable adverse environmental effects of projects they are considering for approval. GHG emissions have the potential to adversely affect the environment because they contribute to global climate change. In turn, global climate change has the potential to: raise sea levels, affect rainfall and snowfall, and affect habitat.

Senate Bill 97

California Senate Bill (SB) 97 directed the California Office of Planning and Research to prepare, develop, and transmit to the Resources Agency amendments to the CEQA Guidelines related to the analysis and mitigation of GHG emissions. The amendments became effective on March 18, 2010.

A new section was added to the CEQA Guidelines (section 15064.4) to assist lead agencies in determining the significance of the impacts of GHG emissions. This section urges lead agencies to quantify the GHG emissions of proposed projects where possible. In addition to quantification, this section recommends consideration of several other qualitative factors that may be used in the

determination of significance, including (1) the extent to which a project may increase or reduce GHG emissions as compared to the existing environmental setting, (2) whether a project's emissions exceed a threshold of significance that the lead agency determines applies to a project, and (3) the extent to which a project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate a project's incremental contribution of GHG emissions.

The guideline amendments do not identify a threshold of significance for GHG emissions, nor do they prescribe assessment methodologies or specific mitigation measures. The guidelines amendments encourage lead agencies to consider many factors in performing a CEQA analysis, but preserve the discretion that CEQA grants lead agencies to make their own determinations based on substantial evidence.

In addition, as part of the CEQA Guideline amendments and additions, a new set of environmental checklist questions (VII. *Greenhouse Gas Emissions*) to the CEQA Guidelines Appendix G have been adopted. The new set asks whether a project would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

Executive Order S-3-05

Executive Order (EO) S-3-05 made California the first state to formally establish GHG emissions reduction goals. EO S-3-05 includes the following GHG emissions reduction targets for California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

The final emission target of 80 percent below 1990 levels would put the state's emissions in line with estimates of the required worldwide reductions needed to bring about long-term climate stabilization and avoidance of the most severe impacts of climate change (IPCC 2007).

EO S-3-05 also dictated that the Secretary of the California Environmental Protection Agency coordinate oversight of efforts to meet these targets with the Secretary of the Business, Transportation and Housing Agency; Secretary of the Department of Food and Agriculture; Secretary of the Resources Agency; Chairperson of the Air Resources Board; Chairperson of the Energy Commission; and the President of the Public Utilities Commission. This group was subsequently named the Climate Action Team (CAT).

As laid out in the EO, the CAT has submitted biannual reports to the governor and State legislature describing progress made toward reaching the targets. The CAT is in the process of finalizing their second biannual report on the effects of climate change on California's resources.

Assembly Bill 32

In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill No. 32; California Health and Safety Code Division 25.5, Sections 38500, et seq., or AB 32). AB 32 further details and puts into law the mid-term GHG reduction target established in EO S-3-05—reduce GHG

emissions to 1990 levels by 2020. AB 32 also identifies CARB as the state agency responsible for the design and implementation of emissions limits, regulations, and other measures to meet the target.

The statute lays out the schedule for each step of the regulatory development and implementation.

- By June 30, 2007, CARB had to publish a list of early-action GHG emission reduction measures.
- Prior to January 1, 2008, CARB had to: identify the current level of GHG emissions by requiring statewide reporting and verification of GHG emissions from emitters and identify the 1990 levels of California GHG emissions.
- By January 1, 2010, CARB had to adopt regulations to implement the early-action measures.

In December 2007, CARB approved the 2020 emission limit (1990 level) of 427 million metric tons of CO_2 equivalents of GHGs. The 2020 target requires the reduction of 169 million metric tons of CO_2e, or approximately 30 percent below the state's projected "business-as-usual" 2020 emissions of 596 million metric tons of CO_2e.

Also in December 2007, CARB adopted mandatory reporting and verification regulations pursuant to AB 32. The regulations became effective January 1, 2009, with the first reports covering 2008 emissions. The mandatory reporting regulations require reporting for major facilities, those that generate more than 25,000 metric tons per year of CO_2e. To date CARB has met all of the statutorily mandated deadlines for promulgation and adoption of regulations.

Climate Change Scoping Plan

On December 11, 2008, pursuant to AB 32, CARB (2008a) adopted the Climate Change Scoping Plan. This plan outlines how emissions reductions will be achieved from significant sources of GHGs via regulations, market mechanisms, and other actions. Six key elements, outlined in the scoping plan, are identified to achieve emissions reduction targets:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewable energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

The Climate Change Scoping Plan also included recommended 39 measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures also put the state on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80

percent below 1990 levels. The measures in the approved Scoping Plan will be developed over the next two years and be in place by 2012.

Executive Order S-13-08

EO S-13-08, issued November 14th, 2008, directs the California Natural Resources Agency, California Department of Water Resources, Office of Planning and Research, Energy Commission, State Water Resources Control Board, State Parks Department, and California's coastal management agencies to participate in a number of planning and research activities to advance California's ability to adapt to the impacts of climate change. The order specifically directs agencies to work with the National Academy of Sciences to initiate the first California Sea Level Rise Assessment and to review and update the assessment every two years after completion; immediately assess the vulnerability of the California transportation system to sea level rise; and to develop a California Climate Change Adaptation Strategy.

California Climate Change Adaptation Strategy

In cooperation and partnership with multiple state agencies, the 2009 California Climate Adaptation Strategy summarizes the best known science on climate change impacts in seven specific sectors (public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture; forestry, and transportation and energy infrastructure) and provides recommendations on how to manage against those threats.

Regional Plans and Policies

The CARB Scoping Plan (January 2009) ("The Scoping Plan") states that local governments are "essential partners" in the effort to reduce GHG emissions. The Scoping Plan also acknowledges that local governments have "broad influence and, in some cases, exclusive jurisdiction" over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Many of the proposed measures to reduce GHG emissions rely on local government actions. The Scoping Plan encourages local governments to reduce GHG emissions by approximately 15 percent from current levels by 2020 (CARB 2008b).

Imperial County Air Pollution Control District (2007) does not have any rules or regulations that explicitly address climate change or GHG emissions, nor are any policies or programs currently being developed or implemented.

The current Imperial County General Plan does not contain any goals, objectives, or policies that explicitly address climate change or GHG gas emissions. However, the Conservation and Open Space Element of the General Plan does contain some air quality policies that could reduce GHG emissions, such as "The County shall establish programs and procedures to encourage the conservation of energy by the general public" (County of Imperial 1993).

3.9.2.3 Additional Technical Advisory Information

OPR Technical Advisory, CEQA and Climate Change

In June 2008, OPR published a technical advisory on CEQA and Climate Change to provide interim advice to lead agencies regarding the analysis of GHGs in environmental documents (OPR 2008). The advisory encourages lead agencies to identify and quantify the GHGs that could result from a proposed

project, analyze the impacts of those emissions to determine whether they would be significant, and to identify feasible mitigation measures or alternatives that would reduce any adverse impacts to a less-than-significant level. The advisory recognizes that OPR will develop, and the Natural Resources Agency will adopt amendments to the CEQA Guidelines pursuant to SB 97.

The advisory provides OPR's perspective on the emerging role of CEQA in addressing climate change and GHG emissions and recognizes that approaches and methodologies for calculating GHG emissions and determining their significance are rapidly evolving. OPR concludes in the technical advisory that climate change is ultimately a cumulative impact realizing that no individual project could have a significant impact on global climate. Thus, projects must be analyzed with respect to the incremental impact of the project when added to other past, present, and reasonably foreseeable probable future projects. In order to make a determination of cumulative significance, OPR recommends that lead agencies undertake an analysis, consistent with available guidance and current CEQA practice (OPR 2008).

The technical advisory points out that neither CEQA nor the CEQA Guidelines prescribe thresholds of significance or particular methodologies for performing an impact analysis. "This is left to lead agency judgment and discretion, based upon factual data and guidance from regulatory agencies and other sources where available and applicable" (OPR 2008). OPR recommends that "the global nature of climate change warrants investigation of a statewide threshold of significance for GHG emissions" (OPR, 2008). Until such a standard is established, OPR advises that each lead agency should develop its own approach to performing an analysis for projects that generate GHG emissions (OPR 2008).

OPR sets out the following process for evaluating GHG emissions. First, agencies should determine whether GHG emissions may be generated by a proposed project, and if so, quantify or estimate the emissions by type or source. Calculation, modeling or estimation of GHG emissions should include the emissions associated with vehicular traffic, energy consumption, water usage and construction activities (OPR 2008).

Agencies should then assess whether the emissions are "cumulatively considerable" even though a project's GHG emissions may be individually limited. OPR states: "Although climate change is ultimately a cumulative impact, not every individual project that emits GHGs must necessarily be found to contribute to a significant cumulative impact on the environment" (OPR 2008). Individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice (OPR 2008).

Finally, if the lead agency determines emissions are a cumulatively considerable contribution to a significant cumulative impact, the lead agency must investigate and implement ways to mitigate the emissions (OPR 2008). OPR states: "Mitigation measures will vary with the type of project being contemplated, but may include alternative project designs or locations that conserve energy and water, measures that reduce vehicle miles traveled by fossil-fueled vehicles, measures that contribute to established regional or programmatic mitigation strategies, and measures that sequester carbon to offset the emissions from the project" (OPR 2008). OPR concludes that "A lead agency is not responsible for wholly eliminating all GHG emissions from a project; the CEQA standard is to mitigate to a level that is "less than significant" (OPR 2008). The technical advisory includes a list of GHG reduction measures in Attachment 3 that can be applied on a project-by-project basis.

California Air Pollution Control Officers Association (CAPCOA)

In January 2008, the California Air Pollution Control Officers Association (CAPCOA) issued a "white paper" on evaluating and addressing GHGs under CEQA (CAPCOA 2008). This resource guide was

prepared to support local governments as they develop their climate change programs and policies. Though not a guidance document, the paper provides information about key elements of CEQA GHG analyses, including a survey of different approaches to setting quantitative significance thresholds. Some of thresholds discussed include:

- Zero (all emissions are significant);
- 900 metric tons/year CO_2e (90 percent market capture for residential and non-residential discretionary development);
- 10,000 metric tons/year CO_2e (potential CARB mandatory reporting level for Cap and Trade program);
- 25,000 metric tons/year CO_2e (the CARB mandatory reporting level for the statewide emissions inventory);
- Unit-based thresholds – based on identifying thresholds for each type of new development and quantifying significance by a 90 percent capture rate.

3.9.3 Affected Environment

3.9.3.1 Global Climate Trends and Associated Impacts

The rate of increase in global average surface temperature over the last hundred years has not been consistent; the last three decades have warmed at a much faster rate – on average 0.32°F per decade. Eleven of the twelve years from 1995 to 2006, rank among the twelve warmest years in the instrumental record of global average surface temperature (going back to 1850) (IPCC 2007).

During the same period over which this increased global warming has occurred, many other changes have occurred in other natural systems. Sea levels have risen on average1.8 millimeters per year; precipitation patterns throughout the world have shifted, with some areas becoming wetter and other drier; tropical cyclone activity in the North Atlantic has increased; peak runoff timing of many glacial and snow fed rivers has shifted earlier; as well as numerous other observed conditions. Though it is difficult to prove a definitive cause and effect relationship between global warming and other observed changes to natural systems, there is high confidence in the scientific community that these changes are a direct result of increased global temperatures (IPCC 2007).

3.9.3.2 California Climate Trends and Associated Impacts

Maximum (daytime) and minimum (nighttime) temperatures are increasing almost everywhere in California but at different rates. The annual minimum temperature averaged over all of California has increased 0.33°F per decade during the period 1920 to 2003, while the average annual maximum temperature has increased 0.1°F per decade (Moser et al. 2009).

With respect to California's water resources, the most significant impacts of global warming have been changes to the water cycle and sea level rise. Over the past century, the precipitation mix between snow and rain has shifted in favor of more rainfall and less snow (Mote et al. 2005; Knowles, Dettinger, and Cayan 2006) and snow pack in the Sierra Nevada is melting earlier in the spring (Kapnick and Hall 2009). The average early spring snowpack in the Sierra Nevada has decreased by about 10 percent during the last century, a loss of 1.5 million acre-feet of snowpack storage (DWR 2008). These changes have significant implications for water supply, flooding, aquatic ecosystems, energy generation, and recreation throughout the state. During the same period, sea levels along California's coast rose 7 inches (DWR 2008). Sea level rise associated with global warming will continue to threaten coastal lands and infrastructure, increase flooding at the mouths of rivers, place additional stress on levees in the Sacramento-San Joaquin Delta,

and will intensify the difficulty of managing the Sacramento-San Joaquin Delta as the heart of the state's water supply system.

3.9.3.3 Local Climate

Local climate is discussed in Section 3.3, Air Quality.

3.9.4 Impacts and Mitigation Measures

Climate change could influence future water supplies and Project operations in future years. Possible changes in Project water supplies include changes in the surface water inflow to the Sea from the major and minor tributaries. The river flow may increase if climate change results in a wetter conditions or decrease under drier conditions. Another climatic factor that could change is evaporation. The rate of evaporation may increase or decrease in response to changes in annual temperatures and relative humidity. Finally, a possible response to climate change may be a change in irrigated acreage or the applied water per acre, which would affect the amount of agricultural water entering the New and Alamo rivers. This type of change however, is bounded by the available water in the Imperial Irrigation District system.

The SCH Project would respond to changes in available water or evaporation by changing, if necessary, the diversion rate from the rivers.

The analysis of future Sea salinity was prepared using the CEQA baseline analysis included in the Salton Sea Ecosystem Restoration Program Final Programmatic Environmental Impact Report (PEIR) (Department of Water Resources and California Department of Fish and Game 2007). The PEIR analysis (PEIR Appendix H2) analyzed flow variability associated with climate change or other factors and estimated that there could be up to 200,000 acre-feet of variability in the annual river flow because of possible climate changes. The average annual flow of the New and Alamo rivers in the past 50 years has been approximately 1.1 million acre-feet. The variability analyzed in the PEIR is therefore up to 18 percent of the historic annual flow.

Data from the PEIR were used in the assessment of future storage and salinity of the Sea with the SCH Project present. Specifically, data from PEIR Table H2-2-3 and Table H2-2-4 (Salton Sea elevation and salinity) were used in a spreadsheet model that superimposed the SCH operations on this projected record. The model was used to assess Project impacts and estimate future salinity of the Sea for each alternative. For this analysis the existing evaporation rate was used without any adjustment for potential future conditions. Three sensitivity runs were then conducted using an annual evaporation that is 50 percent, 100 percent, and 200 percent higher than current conditions. The results showed minor model sensitivity to the evaporation change as measured in Salton Sea storage, area, and salinity.

In summary, potential variability in future conditions because of climate change is addressed through the use of the PEIR CEQA baseline and additional evaporation rate sensitivity analyses. These future conditions are speculative at this time, but the SCH can accommodate the changed conditions and remain operational. The remainder of this impact analysis focuses on the potential impacts of the SCH Project on climate change.

3.9.4.1 Impact Analysis Methodology

The analysis estimates direct and indirect GHG emissions resulting from operation of construction equipment; passenger vehicle trips during construction and operation, transportation of construction materials and equipment, transportation of material inputs for operation or maintenance, waste generation and disposal of materials during construction and operation (included in trucking), and generation of

electricity used for Project operation. Appendix H2 provides detailed lists of construction equipment, anticipated construction schedules, and emission calculations.

Emission calculations for off-road equipment and on-road vehicles were performed using the most recent emission factors published by the South Coast Air Quality Management District (SCAQMD 1993, updated in 2008)[1] and USEPA (2011). Construction is expected to require about 2 years of planned work activities beginning in 2013, although potential delays related to weather, protection of sensitive resources, material delivery, and unforeseen underground conditions could occur. Extending the schedule longer than 2 years would not affect the GHG analysis because it is based on total Project emissions (tonnes), which would remain unchanged.

Grid electric power would be used to operate the water transfer pumps and would utilize both in-state generation and imported power from other western states. California Climate Action Registry (CCAR 2009) GHG emission factors were used in conjunction with GWPs[2] (USEPA 2011) to estimate mixed-resource GHG impacts (CO_2, CH_4, N_2O) comprising fossil-fuel (natural gas, coal), renewable (wind, solar, geothermal, biomass), hydroelectric, and nuclear generation. Pumping power estimates (motor horsepower) for each alternative were converted into annual megawatt-hours (MW-hr) assuming 92 percent motor efficiency and continuous operation (8,760 hours per year), which is conservative. Results are expressed in CO_2e below in Tables 3.9-3 through 3.9-6.

3.9.4.2 Thresholds of Significance

Significance Criteria

It is unlikely that any single project by itself could have a significant impact on the environment. However, the cumulative effect of human activities has been clearly linked to quantifiable changes in the composition of the atmosphere, which in turn have been shown to be the main cause of global climate change (IPCC 2007). Therefore, the analysis of the environmental effects of GHG emissions from this Project will be addressed as a cumulative impact analysis. No quantitative GHG thresholds of significance that would apply to the Project have been established at the Federal, state, or local levels. For purposes of this analysis, an impact would be significant if the Project would:

- Generate GHG gas emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases, including the state goal of reducing greenhouse gas emissions in California to 1990 levels by 2020, as set forth by the timetable established in AB 32, California Global Warming Solutions Act of 2006.

Application of Significance Criteria

The following summarizes the overall methodology used in applying the significance criteria to the Project alternatives:

[1] Imperial County Air Pollution Control District does not publish its own emission factors; hence, those of the neighboring SCAQMD were used. The SCAQMD off-road factors are based on Federal standards pursuant to 40 CFR 89.112; SCAQMD on-road factors are based on 40 CFR 86 et seq. vehicle category standards; the SCAQMD factors are output from CARB's OFFROAD and EMFAC applications, respectively, which reference the cited regulations, respectively.

[2] Greenhouse gases have been assigned a "global warming potential" factor. For CO_2, CH_4, and N_2O, the GWP factors are 1, 21, 310, respectively.

- **Generate GHG emissions that may have a significant impact on the environment** – The Project alternatives would directly and indirectly generate GHG emissions from construction and operational activities. Direct GHG emissions would be generated through fuel consumption, fuel combustion resulting from construction activities, emissions from the transportation of goods and other materials to the sites, and workers traveling in vehicles to and from the sites during both construction and operation.. The Project also would indirectly result in GHG emissions, primarily from the generation of electric power used by the freshwater pumps required for Alternatives 2, 3, 5, and 6, and the seawater pumps required for all alternatives; additionally, a negligible amount of power would be required at the trailer that would serve as office space for the permanent employees. GHG emissions of each alternative are analyzed, and the potential for these emissions to have a significant impact on the environment is compared with existing environmental conditions and regulations.
- **Conflict with any applicable plan, policy, or regulation of an agency for reducing GHG emissions** – The potential for the Project alternatives to conflict with state regulations intended to reduce GHG emissions is analyzed and discussed for each alternative. Included is an evaluation of the alternatives with respect to the state goal of reducing GHG emissions in California to 1990 levels by 2020, as set forth by the timetable established in AB 32, California Global Warming Solutions Act of 2006. Currently, no Federal regulations limit GHG emissions of CO_2 and CH_4; however, emissions of N_2O are regulated (albeit indirectly) through limitation of NO_X emissions as a criteria pollutant under New Source Performance Standards and Federal, state, and local operating permits.

3.9.4.3 No Action Alternative

Emissions of GHGs occur at local and landscape scales, but are distributed globally. As described in Section 3.9.3, GHG emissions have increased greatly over the past 100 years and are linked to increases in global temperatures and other climate changes. The impact of these increased atmospheric concentrations of GHGs constitutes a substantial existing and ongoing adverse impact. As previously mentioned, analysis of the environmental effects of GHG emissions from the Project alternatives is addressed as a cumulative impact analysis only. Because the No Action Alternative by definition cannot contribute to a cumulative impact, no significance determination is made.

3.9.4.4 Alternative 1 – New River, Gravity Diversion + Cascading Ponds

Impact GHG-1: The Project would generate minor amounts of GHG emissions during construction and operations, both directly and indirectly, that would not have a significant impact on the environment (less-than-significant impact). Tables 3.9-3 through 3.9-6 summarize the direct GHG emissions from construction and direct and indirect emissions associated with operations; details are included in Appendix H2. Emissions can be compared to those occurring under the No Action Alternative. None of the Project activities would occur under the No Action Alternative; hence, zero emissions would occur.

As shown in Table 3.9-3, construction would generate approximately 5,800 metric tonnes of CO_2e over the course of 2 years. These emissions would be temporary and would cease upon completion of work. Moreover, they would be well under the amount of GHG emissions that major facilities are required to report emissions (25,000 metric tons of carbon dioxide equivalents (CO_2e) or more per year).

Table 3.9-3 Estimated Construction GHG Emissions for Alternatives 1 to 6

Greenhouse Gas	Project Alternative						
	No Action	1	2	3	4	5	6
	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes
Carbon Dioxide (GHG - CO_2)	0	5,724	4,742	6,569	3,357	3,019	3,911
Methane (GHG - CH_4)	0	0.4	0.4	0.5	0.3	0.2	0.3
Nitrous Oxide (GHG - N_2O)	0	0.2	0.2	0.2	0.1	0.1	0.1
Carbon Dioxide Equivalents (CO_2e)	0	5,796	4,800	6,650	3,400	3,057	3,960

Sources: SCAQMD 1993, updated in 2008; USEPA 2011

Notes:

Units are metric tonnes (1,000 kilograms or 2,204.6 pounds).

Totals include importing equipment from other areas in state.

Table 3.9-4 Estimated Operational Direct GHG Emissions for Alternatives 1 to 6

Greenhouse Gas	Project Alternative						
	No Action	1	2	3	4	5	6
	tonnes	tonnes/yr	tonnes/yr	tonnes/yr	tonnes/yr	tonnes/yr	tonnes/yr
Carbon Dioxide (GHG - CO_2)	0	94	93	102	82	83	87
Methane (GHG - CH_4)	0	0.008	0.008	0.009	0.007	0.007	0.007
Nitrous Oxide (GHG - N_2O)	0	0.004	0.004	0.004	0.003	0.003	0.003
Carbon Dioxide Equivalents (CO_2e)	0	96	94	103	83	84	88

Sources: SCAQMD 1993, updated in 2008; USEPA 2011

Note:

Units are metric tonnes (1,000 kilograms or 2,204.6 pounds).

Table 3.9-5 Estimated Operational Indirect GHG Emissions from Electric Power Usage for Alternatives 1 to 6

Greenhouse Gas	Project Alternative						
	No Action	1	2	3	4	5	6
	tonnes	tonnes/yr	tonnes/yr	tonnes/yr	tonnes/yr	tonnes/yr	tonnes/yr
Carbon Dioxide (GHG - CO_2)	0	2,275	1,954	3,004	1,400	817	2,362
Methane (GHG - CH_4)	0	0.09	0.08	0.13	0.06	0.03	0.10
Nitrous Oxide (GHG - N_2O)	0	0.03	0.02	0.03	0.02	0.01	0.03
Carbon Dioxide Equivalents (CO_2e)	0	2,284	1,962	3,017	1,406	820	2,373

Source: CCAR 2009

Table 3.9-6 Estimated Operational Combined Direct and Indirect GHG Emissions for Alternatives 1 to 6

Greenhouse Gas	Project Alternative						
	No Action	1	2	3	4	5	6
	tonnes	tonnes/yr	tonnes/yr	tonnes/yr	tonnes/yr	tonnes/yr	tonnes/yr
Carbon Dioxide (GHG - CO_2)	0	2,369	2,047	3,106	1,482	899	2,449
Methane (GHG - CH_4)	0	0.10	0.09	0.13	0.07	0.04	0.11
Nitrous Oxide (GHG - N_2O)	0	0.03	0.03	0.04	0.02	0.01	0.03
Carbon Dioxide Equivalents (CO_2e)	0	2,380	2,057	3,120	1,489	904	2,461

Sources: SCAQMD 1993, updated in 2008; USEPA 2011; CCAR 2009

Notes:

Units are metric tonnes (1,000 kilograms or 2,204.6 pounds).

Totals include power plant emissions outside the Project vicinity.

The primary power demand during operations would result from pumping. Minimal power would be required at the trailer that would serve as office space for the permanent employees. During operation, the pumps required to move water from the river to the ponds would utilize an average of 975 motor horsepower and consume about 6,925 MW-hr of electric power annually. Thus, indirect GHG emissions from the fossil fuel component of mixed electric power generation would increase as a result of the Project. Indirect GHG emissions from electric power used by the pumping plants would be about 2,280 metric tonnes CO_2e annually (CCAR 2009). As noted in Section 3.9.2.2, the State of California has imposed a number of regulations requiring the reduction of GHG emissions and the increased use of renewable energy sources. Thus, power required to operate the Project pumps would increasingly come from sources that minimized the production of GHG emissions.

In addition to indirect generation emissions, direct GHG emissions from maintenance equipment and vehicles would be about 96 metric tonnes CO_2e annually. Combined direct and average indirect operational emissions would be about 2,380 metric tonnes CO_2e annually.

Due to its small scale and requirements imposed on power sources by the State of California, the Project's impacts on the environment as a result of the GHG emissions generated during construction and operations would be less than significant when compared to both the existing environmental setting and the No Action Alternative. Moreover, the SCH Project would comply with the best management practices outlined in Section 2, which would reduce the amount of GHGs generated by the Project.

Impact GHG-2: The Project would generate GHG emissions during construction and operations, but would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions (less-than-significant impact). The SCH Project would not have the potential to conflict with or be inconsistent with plans to reduce or mitigate GHGs. Project-level, such as the SCH Project, are not explicitly addressed in existing plans to reduce or mitigate GHGs. Therefore, the SCH Project would not be in conflict with or inconsistent with those plans, because it would not preclude the attainment of the goals or objectives of applicable plans. For example, this Project would not affect the sectors addressed by AB 32 such that a goal or objective of the plan would no longer be attainable. This impact would be less than significant when compared to both the existing environmental conditions and the No Action Alternative.

3.9.4.5 Alternative 2 – New River, Pumped Diversion

Impact GHG-1: The Project would generate minor amounts of GHG emissions during construction and operations, both directly and indirectly, that would not have a significant impact on the environment (less-than-significant impact). The discussion under Alternative 1 is applicable to this alternative, except emissions would be lower (refer to Tables 3.9-3 to 3.9-6).

Impact GHG 2: The Project would generate GHG emissions during construction and operations, but would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions (less-than-significant impact). The discussion under Alternative 1 is applicable to this alternative.

3.9.4.6 Alternative 3 – New River, Pumped Diversion + Cascading Ponds

Impact GHG-1: The Project would generate minor amounts of GHG emissions during construction and operations, both directly and indirectly, that would not have a significant impact on the environment (less-than-significant impact). The discussion under Alternative 1 is applicable to this alternative, except emissions would be higher (refer to Tables 3.9-3 to 3.9-6).

Impact GHG 2: The Project would generate GHG emissions during construction and operations, but would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions (less-than-significant impact). The discussion under Alternative 1 is applicable to this alternative.

3.9.4.7 Alternative 4 – Alamo River, Gravity Diversion + Cascading Pond

Impact GHG-1: The Project would generate minor amounts of GHG emissions during construction and operations, both directly and indirectly, that would not have a significant impact on the environment (less-than-significant impact). The discussion under Alternative 1 is applicable to this alternative, except emissions would be lower (refer to Tables 3.9-3 to 3.9-6).

Impact GHG 2: The Project would generate GHG emissions during construction and operations, but would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions (less-than-significant impact). The discussion under Alternative 1 is applicable to this alternative.

3.9.4.8 Alternative 5 – Alamo River, Pumped Diversion

Impact GHG-1: The Project would generate minor amounts of GHG emissions during construction and operations, both directly and indirectly, that would not have a significant impact on the environment (less-than-significant impact). The discussion under Alternative 1 is applicable to this alternative, except emissions would be lower (refer to Tables 3.9-3 to 3.9-6).

Impact GHG 2: The Project would generate GHG emissions during construction and operations, but would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions (less-than-significant impact). The discussion under Alternative 1 is applicable to this alternative.

3.9.4.9 Alternative 6 – Alamo River, Pumped Diversion + Cascading Ponds

Impact GHG-1: The Project would generate minor amounts of GHG emissions during construction and operations, both directly and indirectly, that would not have a significant impact on the environment (less-than-significant impact). The discussion under Alternative 1 is applicable to this alternative, except emissions would be higher (refer to Tables 3.9-3 to 3.9-6.)

Impact GHG 2: The Project would generate GHG emissions during construction and operations, but would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing GHG emissions (less-than-significant impact). The discussion under Alternative 1 is applicable to this alternative.

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